Space Weather Forecast

Issued on Friday, 31 May 2024 at 00:16 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Chance of isolated Strong flares on all days. Chance of G1-G2/Minor to Moderate geomagnetic storm activity, mainly day 2 (01 June).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity reached High levels during the last 24 hours, following a long duration strong flare at 29/1437UTC from a large, complex active region in the southeast.

There are currently seven sunspot regions on the visible disc. The largest region, located in the southeast of the disc rotated into clearer view with a complex magnetic configuration. Overall it evolved slowly though with little change in overall size and appearance. The moderately large region in the north-centre disc supported a complex structure and appearance, although there have been signs of simplification taking place in recent hours and reduction in overall size. The other sunspot groups on the disc are small, simple and appear stable at this time. A small region in the northeast disc decayed during the period.

No new Earth-directed Coronal Mass Ejections (CMEs) were observed in available imagery.

Solar Wind / Geomagnetic Activity: Solar winds were indicative of a slow wind regime, with background speeds observed between 320-380km/s. The Interplanetary Magnetic Field (IMF) varied between weak and moderate levels. The important north-south component was predominately northward until around 30/1045 UTC, after which largely southward values were observed. Geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no solar radiation storms occurring.

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Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is expected, with a chance of isolated Strong flares throughout the period. The moderately large regions in the southeast and north-centre disc provide the bulk of the current significant flare risk.

Solar Wind / Geomagnetic Activity: A CME that left the Sun on 29 May from a large flare in the southeast disc has been modelled as a potential glancing blow at Earth on day 2 (01 June), with a chance for an earlier arrival time very late on day 1 (31 May). No other Earth-directed CMEs currently feature in the forecast.

Solar winds are likely to persist at background through day 1 (31 May) and day 2 (01 June) in the absence of any potential CME arrival. A small coronal hole in the northwest disc could give a modest enhancement from late day 2 (01 June) or day 3 (02 June). Any connection to this feature should see speeds peak at slightly elevated levels on day 3 or 4 (02 or 03 June).

Geomagnetic activity is expected to be mainly Quiet on day 1 (31 May) with a chance of isolated Unsettled intervals. Any early arrival of the 29 May CME, could see activity increase to G1-G2/Minor-Moderate Storm levels late on day 1 (31 May), though this is considered more likely on day 2 (01 June). On day 3 (02 June), there is a slight chance of peak G1/Minor Storm conditions resulting from minor coronal hole and possible residual CME influence, otherwise activity should be at Quiet to Unsettled levels, easing to become Quiet by day 4 (03 June).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to persist at background levels, with a slight chance of solar radiation storms given any further notable flares.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	40	10	1
Strong	G3	No	5	10	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	75	75	75	75
Very Active	R3 to R5 X	No	20	20	20	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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